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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/099,961	03/19/2002	Yong-Tak Lee	112328	5498

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OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER	
MONBLEAU, DAVIENNE N	
ART UNIT	**PAPER NUMBER**
2878	

DATE MAILED: 04/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/099,961	LEE ET AL.	
	Examiner	Art Unit	
	Davienne Monbleau	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The amendment filed on 12/29/03 has been entered. Claims 1-3, 6, 9-12 and 14 have been amended. Claims 1-14 are pending.

Drawings

The drawings were received on 12/29/03. These drawings are acceptable.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art Figure 2 (*APA Figure 2*) in view of Yeo et al. ("Integration of Waveguide...").

Regarding Claim 1, *APA Figure 2* teaches a wavelength stabilizing method comprising a light source (11), a first photodetector (42) and a second photodetector (43), wherein the outputs

are compared in a comparator (52) to a reference voltage (V_{ref}) and the wavelength is shifted accordingly (via temperature control device 80) to stabilize the wavelength. Prior Art Figure 2 does not teach QCSE photodetectors. *Yeo* teaches in Figure 1 two QCSE photodetectors and teach on page 3 column 2 a tunable DFB laser diode emitting light to said QCSE photodetectors. *Yeo* further teaches in Figure 3 overlapping the photocurrent vs. wavelength plots from the respective QCSE photodetectors when a bias voltage is applied. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use QCSE photodetectors in *APA Figure 2*, as taught by *Yeo*, to de-multiplex separated wavelengths and stabilize the laser source at a particular wavelength. This makes the device highly suitable for fiber-optic communication systems. (See page 1 column 1). *APA Figure 2* in view of *Yeo* does not teach that said graphs are obtained based on a peak of 1s exciton. However, it is inherent that QCSE photodetectors operate by creating an absorption spectrum and the maximum efficiency is an absorption spectrum based on a peak of 1s exciton.

Regarding Claim 5, *APA Figure 2* teaches a power stabilizing method comprising a light source (11), a first photodetector (42) and a second photodetector (43), wherein the outputs are compared in a comparator (52) to a reference voltage (V_{ref}) and the current to the laser is adjusted accordingly (61) to stabilize the power. *APA Figure 2* does not teach QCSE photodetectors. *Yeo* teaches in Figure 1 two QCSE photodetectors and teach on page 3 column 2 a tunable DFB laser diode emitting light to said QCSE photodetectors. *Yeo* further teaches in Figure 3 overlapping the photocurrent vs. wavelength plots from the respective QCSE photodetectors when a bias voltage is applied. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use QCSE photodetectors in *APA Figure 2*,

as taught by *Yeo*, to de-multiplex separated wavelengths and stabilize the laser source at a particular power level. This makes the device highly suitable for fiber-optic communication systems. (See page 1 column 1).

Regarding Claim 6, *APA Figure 2* teaches a wavelength/power stabilizing system comprising a laser diode (11), a first photodetector (42) and a second photodetector (43), wherein the outputs are compared in a comparator (52) to a reference voltage (V_{ref}), a wavelength stabilizing temperature control part (80) to control the temperature of the laser diode, and a power stabilizing driving control part (61) to control the driving current to the laser diode. *APA Figure 2* further teaches adder (53) along with said comparator (52) for said wavelength control, but not for power control. However, it would have been obvious to one of ordinary skill in the art to apply the same process to control the power in order to stabilize the output power of the laser diode. *APA Figure 2* does not teach QCSE photodetectors. *Yeo* teaches in Figure 1 two QCSE photodetectors and teach on page 3 column 2 a tunable DFB laser diode emitting light to said QCSE photodetectors. *Yeo* further teaches in Figure 3 overlapping the photocurrent vs. wavelength plots from the respective QCSE photodetectors when a bias voltage is applied. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use QCSE photodetectors in *APA Figure 2*, as taught by *Yeo*, to de-multiplex separated wavelengths and stabilize the laser source at a particular power level. This makes the device highly suitable for fiber-optic communication systems. (See page 1 column 1).

Regarding Claim 10, *APA Figure 2* teaches a wavelength/power stabilizing system comprising a DBR laser diode (11), a first photodetector (42) and a second photodetector (43), wherein the outputs are compared in a comparator (52) to a reference voltage (V_{ref}), a

wavelength stabilizing temperature control part (80) to control the temperature of the laser diode, and a power stabilizing driving control part (61) to control the driving current to the laser diode. It is known in the art that for a DBR laser source the tuning current goes to the tuning section of the laser and the driving tuning goes to the gain section of the laser. *APA Figure 2* further teaches adder (53) along with said comparator (52) for said wavelength control, but not for power control. However, it would have been obvious to one of ordinary skill in the art to apply the same process to control the power in order to stabilize the output power of the laser diode. *APA Figure 2* does not teach QCSE photodetectors. *Yeo* teaches in Figure 1 two QCSE photodetectors and teach on page 3 column 2 a tunable DFB laser diode emitting light to said QCSE photodetectors. *Yeo* further teaches in Figure 3 overlapping the photocurrent vs. wavelength plots from the respective QCSE photodetectors when a bias voltage is applied. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use QCSE photodetectors in *APA Figure 2*, as taught by *Yeo*, to de-multiplex separated wavelengths and stabilize the laser source at a particular power level. This makes the device highly suitable for fiber-optic communication systems. (See page 1 column 1).

Regarding Claim 12, *APA Figure 2* teaches a wavelength/power stabilizing system comprising a laser diode (11), a beam splitter (22), a first photodetector (42) and a second photodetector (43), wherein the outputs are compared in a comparator (52), a temperature control circuit (80) to control the temperature of the laser diode, and a laser diode driver (61) to control the driving current to the laser diode. TECs are known in the art to sufficiently stabilize the laser diode temperature. *APA Figure 2* does not teach QCSE photodetectors. *Yeo* teaches in Figure 1 two QCSE photodetectors and teach on page 3 column 2 a tunable DFB laser diode emitting light

to said QCSE photodetectors. *Yeo* further teaches in Figure 3 overlapping the photocurrent vs. wavelength plots from the respective QCSE photodetectors when a bias voltage is applied. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use QCSE photodetectors in *APA Figure 2*, as taught by *Yeo*, to de-multiplex separated wavelengths and stabilize the laser source at a particular power level. This makes the device highly suitable for fiber-optic communication systems. (See page 1 column 1).

Regarding Claim 2, *APA Figure 2* teaches that the photodetectors are used to provide feedback signals for feedback control of the single light source.

Regarding Claim 3, *Yeo* teaches on page 4 column 1 applying bias voltages to each photodetector, which is required in the operation of the photodetector in order to create an absorption spectrum.

Regarding Claims 4, 7 and 13, *Yeo* teaches on page 3 column 2 a DFB laser diode.

Regarding Claim 8, *APA Figure 2* does not teach the specifics of increasing or decreasing the temperature. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to alter the temperature in a particular direction based upon the outputted date of the photocurrent vs. wavelength plots since wavelength is directly proportional to temperature. Thus, if a wavelength output is too high, the temperature is lowered to decrease the wavelength.

Regarding Claims 9, 11 and 14, *Yeo* teaches in Figure 3 that the QCSE photodetectors have different absorption characteristics and in Figure 1 that they are integratedly formed by quantum well mixing.

Response to Arguments

Applicant's arguments filed 12/29/03 have been fully considered but they are not persuasive.

The Applicant argues that the cited prior art of record does not teach that said wavelength plots are obtained based on a peak absorption spectrum of 1s exciton. However, it is well known in the art that QCSE photodetectors only operate at wavelengths near the excitonic absorption edge of the quantum wells such that under an applied electric field the waveguide absorbs more light due to the stark-shift of the n=1 exciton (which is equivalent to the 1s exciton ... where n=1). (See also newly cited art *Hietala* column 13 lines 40-50).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. *Tokuda et al.* (US 5,144,397) teach a light responsive semiconductor device utilizing the quantum Compton stark effect (column 1 lines 23-27) with a 1s exciton absorption spectrum (column 5 lines 3-8).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Davienne Monbleau whose telephone number is 571-272-1945. The examiner can normally be reached on Mon-Fri 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Davienne Monbleau
DNM

DAVID PORTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800